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Original Article

Management of hypertensive emergencies in the emergency department: presenting complaints and outcomes

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ABSTRACT

Aims: This study aimed to evaluate the clinical features, management strategies, and outcomes of patients presenting with hypertensive conditions to the emergency department (ED). The findings aim to contribute to the epidemiological profiling of hypertensive emergencies and enhance management practices in EDs.

Methods: A retrospective, observational study was conducted at Ankara Etlik City Hospital ED between September 16 and September 23, 2024. Patients aged ≥18 years with a blood pressure (BP) ≥140/90 mmHg were included. Pregnant, postpartum, or breastfeeding women and those with incomplete data were excluded. Data were collected on demographics, clinical features, comorbidities, diagnostics, treatments, and outcomes. Statistical analysis involved descriptive and comparative methods, with significance set at $p<0.05$.

Results: The study included 111 patients (61 females, 55%; 50 males, 45%) with a mean age of 56.36 years. Among them, 10 patients (9.9%) required hospitalization, while 100 (90.1%) were discharged. The mean systolic and diastolic BP were 163.7 mmHg and 89.3 mmHg, respectively. Common presenting symptoms included headache (14.4%), chest pain (5.5%), and hematuria (1.8%), while 10.8% were asymptomatic. Hospitalization rates were significantly higher in female patients ($p=0.012$). However, no significant associations were found between BP values, diagnostic interventions, or treatments and hospitalization outcomes.

Conclusion: The study highlights the challenges in managing hypertensive patients in EDs, especially those without target organ damage. While female patients showed higher hospitalization rates, factors like BP levels and diagnostic interventions did not correlate with outcomes. Further multicenter and prospective studies are needed to explore these findings and develop individualized, evidence-based approaches for hypertensive patient care in EDs.

Keywords: Hypertension, emergency department, hypertensive crisis, management

INTRODUCTION

Hypertension is a leading modifiable risk factor for vascular diseases, including cardiovascular and cerebrovascular conditions. Despite its widespread prevalence, many individuals with hypertension remain undiagnosed, and among those diagnosed, blood pressure (BP) control is often suboptimal.[1,2] The existing literature provides detailed recommendations and evidence for managing hypertension in outpatient settings and offers clear guidance for patients presenting to the emergency department (ED) with hypertensive crises. However, there is limited guidance for managing patients who present to the ED with significantly elevated BP without a hypertensive emergency.[3,4] Studies indicate that nearly half of patients presenting to the ED exhibit hypertension, regardless of the presence or absence of new or worsening target organ damage.[5]

The management of hypertension in the ED can be categorized into two main groups: asymptomatic severe hypertension and significantly elevated BP with evidence of new or worsening target organ damage. Management strategies for cases involving target organ damage are more clearly defined and supported by higher-quality evidence.[6] However, there is currently no consensus on the optimal treatment strategies for patients presenting to the ED with hypertension but without target organ damage.[7] Moreover, aggressive treatment strategies may impair perfusion and negatively impact patient outcomes. Approximately one-third of patients receiving intravenous antihypertensive therapy are reportedly treated inappropriately.[8] These findings highlight the need for further research to improve ED practices in this area.

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In this study, we aimed to evaluate the clinical characteristics, management strategies, and outcomes of patients presenting to the ED with hypertensive conditions. We hope the data obtained will contribute to defining the epidemiological profile of hypertensive emergencies and improving the management of these cases in ED settings.

METHODS

Study Design

This study was designed as a retrospective and observational analysis. It included patients presenting with elevated blood pressure to the Emergency Department (ED) of Ankara Bilkent City Hospital between September 16, 2024, and September 23, 2024. Ethical approval for this study was obtained from the Ankara Etlik City Hospital Ethics Committee (Date: 25/09/2024, Decision No: AEŞ-BADEK-2024-888). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Participants

Patients aged 18 years and older with a blood pressure of 140/90 mmHg or higher at the time of presentation were included in the study. Pregnant, postpartum, or breastfeeding women, as well as patients with incomplete data, were excluded. Both male and female patients were included to form a heterogeneous population.

Data Collection

Patient records were screened using the Hospital Information Management System (HIMS) with the keyword "hypertension." Eligible patients meeting the inclusion criteria were identified. Data were collected on demographic characteristics, clinical features, comorbidities, diagnostic tests performed, and treatment outcomes.

Inclusion Criteria

- Age ≥18 years
- Presentation to the ED within the specified dates
- Blood pressure at presentation of at least 140/90 mmHg

Exclusion Criteria

- Pregnant, postpartum, or breastfeeding women
- Patients with incomplete data

Evaluation Parameters

- **Demographic characteristics:** Age, gender
- **Clinical features and physical examination findings:** Presenting complaints
- **Comorbidities:** Pre-existing conditions and medications used
- **Diagnostic tests:** ECG, computed tomography, blood tests
- **Outcomes:** Discharge, hospitalization

Statistical Analysis

The collected data were analyzed using descriptive and comparative statistical methods. Categorical variables were presented as frequencies and percentages, while numerical variables were expressed as mean±standard deviation for normally distributed data, or median (min–max) for non-normally distributed data. Normality was assessed using the Kolmogorov-Smirnov test. Comparisons were conducted using Chi-square and Mann-Whitney U tests. ROC analysis was performed to determine optimal cut-off points, with $p<0.05$ considered statistically significant. All analyses were performed using IBM SPSS version 25.0.

RESULTS

Our study included a total of 111 patients, of whom 61 were female and 50 were male. The mean age of the patients was 56.36 years. By the end of the follow-up period, 10 patients (9.9%) were hospitalized, while 100 patients (90.1%) were discharged. The mean systolic blood pressure (SBP) of the patients at presentation was 163.7 mmHg, and the mean diastolic blood pressure (DBP) was 89.3 mmHg.

Among the patients, 12 (10.8%) presented to the emergency department (ED) with elevated blood pressure without any symptoms, 16 (14.4%) had headaches, 6 (5.5%) experienced chest pain, 2 (1.8%) had hematuria, and 75 (67.5%) presented with symptoms not suggestive of target organ damage (Table 1).

Table 1. Demographic and clinical characteristics of patients presenting to the emergency department with hypertension

Age (mean) years		56.36
Sex n (%)	Female	61 (55%)
	Male	50 (45%)
Hospitalization n (%)	Yes	11 (9.9%)
	No	100 (90.1%)
Blood pressure (mean) n (%)	Systolic blood pressure	163.7 mmHg
	Diastolic blood pressure	89.3 mmHg
Admission symptom n (%)	Asymptomatic	12 (10.8%)
	Headache	16 (14.4%)
	Chest pain	6 (5.5%)
	Hematuria	2 (1.8%)
	Other symptoms	75 (67.5%)

The mean age of discharged patients was 56.2±15.1 years, while the mean age of hospitalized patients was 57.6±22.0 years, with no statistically significant difference between the groups (p=0.850). Regarding the gender distribution of hospitalizations, 90% of hospitalized patients were female, whereas 51% of discharged patients were female. Women had a significantly higher hospitalization rate compared to men (p=0.012).

The median systolic blood pressure (SBP) was 160.50 mmHg in the discharged group and 160.0 mmHg in the hospitalized group, with no significant difference observed between the groups (p=0.407). Similarly, the diastolic blood pressure (DBP) was 89.4±13.8 mmHg in the discharged group and 88.3±12.4 mmHg in the hospitalized group, with no significant difference (p=0.810, 95% CI: -7.55 to 9.65).

In terms of clinical assessments, there was no significant difference between the groups in the following parameters:

- Positive physical examination findings (8% vs. 9.1%, p=1.000)
- Laboratory tests ordered (62.0% vs. 63.6%, p=1.000)
- Chest X-rays obtained (28.0% vs. 36.4%, p=0.727)
- Brain CT scans performed (14.0% vs. 0.0%, p=0.353)
- ECG performed (28.0% vs. 9.1%, p=0.283)

Similarly, no significant difference was found regarding whether any treatment was administered in the ED between discharged and hospitalized patients (p=0.332) (Table 2).

Table 2. Factors affecting hospitalization in patients presenting to the ED with hypertension

Variables		Discharge n (%)	Hospitalization n (%)	p-value/(95 CI%)
Age		56.2±15.1	57.6±22.0	0.850/(-16.25 - 13.62)*
Gender	Female	51 (51.0)	10 (90.9)	**0.012****
	Male	49 (49.0)	1 (9.1)	
SBP (mmHg)		160.50 (152.2-176.0)	160.0 (146.0-167.0)	0.407***
DBP (mmHg)		89.4±13.8	88.3±12.4	0.810/(-7.55 – 9.65)*
Positive physical findings		8 (8)	1 (9.1)	1.000**
Laboratory testing ordered		62 (62.0)	7 (63.6)	1.000**
X-Ray		28 (28.0)	4(36.4)	0.727**
Brain CT		14 (14.0)	0 (0.0)	0.353**
ECG performed		28 (28.0)	1 (9.1)	0.283**
Any treatment administered		63 (54.5)	5 (45.5)	0.332**

*Independent sample t test, Mean±SD, **Fisher exact test, n(%), ***Mann-Whitney U test, Median (25-75%), SBP: Systolic blood pressure, DBP: Diastolic blood pressure, CT: Computed tomography, ECG: Electrocardiography

DISCUSSION

In our study, we retrospectively examined the demographic and clinical characteristics as well as the management strategies of patients presenting to the ED with hypertension. Hypertension is a prevalent condition in the general population and is a significant modifiable risk factor for severe complications, including cardiovascular and cerebrovascular diseases. Despite its prevalence, no clear consensus exists regarding the management of patients presenting to the ED with elevated blood pressure but without target organ damage. Our findings demonstrated that factors such as age, blood pressure values, laboratory results, and imaging studies were not associated with hospitalization outcomes in patients presenting with non-emergency hypertension. However, gender was significantly associated with hospitalization rates, with female patients being more likely to be hospitalized, highlighting the need for further investigation in this area.

The mean age of our study population was 56 years, with 55% being female. A review of the literature shows that the age distribution in similar studies varies between 50 and 75 years.[9] This variation could be attributed to differences in preventive healthcare strategies in different countries. For instance, the mean age of patients presenting with hypertension to the ED was found to be 76 years in a study conducted in France, compared to 49 years in a similar study in Burkina Faso.[10,11] Unlike most studies focusing on hypertensive crises (SBP >180 mmHg, DBP >120 mmHg), our study included patients with a hypertension diagnosis based on the Joint National Committee (JNC 8) guidelines (BP >140/90 mmHg).[12] This inclusion criterion may have excluded younger patients with transient or secondary causes of elevated blood pressure (e.g., pain), potentially contributing to the lower mean age observed in our study.

Our findings also revealed a higher proportion of female patients. Similar trends have been reported in studies by Pierin et al.[13] (57%), Mandi et al.[10] (37%), and Guiga et al.[11] (55%). Pinna et al.[14] also reported comparable results, demonstrating that men with hypertensive crises were less likely to be aware of their hypertension diagnosis, used medications less regularly, and were at higher risk for adverse outcomes. Women were found to have higher mean SBP and age. Other studies also emphasize the predominance of female patients presenting to the ED with hypertensive crises.[9,15] However, no evidence in the existing literature indicates worse outcomes or higher hospitalization rates among female patients. While our gender-related findings align with the literature regarding proportions, the differences in hospitalization and clinical follow-up outcomes may stem from our study's limited sample size and timeframe. The exclusion of patients with incomplete data and the short study period may limit the generalizability of our results.

Regarding presenting symptoms, most patients were found to have elevated blood pressure incidentally during their ED visit for other reasons, while some presented solely for asymptomatic hypertension. Symptomatic cases predominantly reported neurological or cardiac symptoms. We believe patient education could help reduce unnecessary ED visits for incidental hypertension. The literature supports the role of patient education in improving outcomes and reducing unnecessary hospital visits.[16,17] Studies on hypertensive crises show results consistent with our findings.[14,15,18] The primary distinction of our study from existing literature is the inclusion of all cases of elevated blood pressure, not just hypertensive crises.

Limitations

Our study has several limitations. First, as a retrospective analysis, it is inherently susceptible to selection and information bias due to incomplete or missing data. Patients with incomplete records were excluded to minimize this, which may have affected the generalizability of our findings. Second, the limited sample size and short timeframe may not fully represent the broader population of hypertensive patients presenting to EDs. Lastly, confounding factors such as comorbidities, medication adherence, and socioeconomic status were not comprehensively analyzed, which may have influenced the observed gender differences in hospitalization rates.

CONCLUSION

This study underscores the complexity of managing hypertensive patients in the ED, particularly in the absence of target organ damage. By broadening the inclusion criteria to encompass all hypertensive presentations, our study contributes to the literature and emphasizes the importance of individualized, evidence-based approaches for hypertensive patients in emergency care. Further prospective and multicenter studies are recommended to validate these findings and explore underlying gender-specific disparities.

ETHICAL DECLARATIONS

Ethics Committee Approval

Ethical approval for this study was obtained from the Ankara Bilkent City Hospital Ethics Committee (Date: 25/09/2024, Decision No: AEŞ-BADEK-2024-888).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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